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RECENT USSR WORK ON CANCEROGENIC AGENTS
CONTAINING PHOSPHORUS

[Numbers in parentheses refer to appended sources.]

At a joint meeting of the Department of Chemical Sciences, Academy of Sciences USSR, and the Department of Physicomathematical and Chemical Sciences, Academy of Sciences Ukrainian SSR, which took place on 9-12 June 1950 at Kiev, B. A. Arbuzov, Corresponding Member of the Academy of Sciences USSR, presented a paper entitled "Carcinogenic Substances Related to Pyrene" of which N. P. Grechkin is co-author. The work on which this paper is based was carried out at the Laboratory of the Chemical Institute, Kazan' Affiliate of the Academy of Chemical Sciences USSR. A brief resume of the text, as given in an editorial in Izvestiya Akademii Nauk SSSR (1) follows:

It was held until quite recently that the most pronounced carcinogenic properties are exhibited by pentacyclic condensed hydrocarbons. Information on the capacity of hexacyclic and higher hydrocarbons to produce malignant tumors was almost entirely lacking. In the course of the present work, 1, 2, 4, 5-dibenzopyrene (I) and its alkyl derivatives as well as 1, 2-benzo-4, 5-benzopyrene (II) were synthesized. Tests carried out on white mice by Dr. N. I. Vylegzhanin at the Kazan' Institute for the Improvement of Physicians showed that both I and II are highly active. All mice which had received subcutaneous injections of oil containing I developed sarcomas within 75-100 days. I also produces cancerous tumors. Thus, I approaches methylcholanthrene or 3, 4-benzopyrene as far as its activity is concerned. II, which contains seven condensed benzene nuclei, was found to be extremely active. Independently of its carcinogenic effect, II produces in mice a clearly expressed leukemoid reaction.

In the course of the investigation in question, derivatives of the carcinogenic 9, 10-dimethyl-1, 2-benzanthracene which contains phosphorus and phosphorus derivatives of other compounds were synthesized. The results obtained on hexacyclic and heptacyclic condensed hydrocarbons are not in agreement with the hypothesis postulating the existence in molecules of carcinogenic compounds of a "K" region possessing an increased electronic density.

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[From the point of view of the synthesis of organophosphorus compounds acting as cancerogenic irritants, a recent paper (2) published by B. M. Mikhaylov and N. F. Kucherova of the Institute of Normal and Pathological Medicine, Academy of Medical Sciences USSR, is of definite interest. The substance of this paper is given below:]

In the synthesis of phosphorus derivatives of polynuclear aromatic compounds the use of conventional chemical reactions leads to difficulties, as could be shown on the example of anthracene. For that reason, organolithium derivatives of the aromatic compounds in question were used. By reacting the corresponding organolithium compounds with phosphorus trichloride, phosphorus oxychloride, or piperidylphosphoryl dichloride, it was possible to prepare in good yields phosphines, phosphine oxides, and phosphonic acids, respectively, containing large polycyclic radicals such as anthryl, bromanthryl, and 1, 2-benzanthryl.

SOURCES

1. Izvestiya Akademii Nauk SSSR, Otdel Khim Nauk, No 5, Sep - Oct 1950, pp 552-3.
2. Doklady Akademii Nauk, SSSR, Vol LXXIV, No 3, 21 Sep 1950, pp 501-4.

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